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ABSTRACT

The aim of this investigation was to determine whether the most effective prediction of freshman college achievement could be obtained through using raw scores from the Dogmation Scale, Gough-Sanford Rigidity Scale, California F Scale, and the Canadian Opinionation Scale or through using a set of factor scores extracted from a combination of the above four as predictors of grade point average. The four measures were administered to 738 freshmen. A group of 140 cases were then selected, 50 for cross validation purposes and 90 to develop the necessary regression equations. Results showed that neither the factor scores nor the raw scores from the measures proved to be strong predictors of academic performance as represented by grade point average. From the results of this study it can be concluded that only the raw scores for the four psychological tests are significantly related to academic achievement of college freshmen. The three factors which were extracted may be of some interest in relationship to student activism. (KJ)

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The Value of Selected Measures of Personality Characteristics as Predictors of College Achievement

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One function of education has been to transmit the skills and values of a society (Wallerstein, 1969, p.3). Several authors have stressed the need for change in contemporary education (Anderson, 1968; Brogan, 1960; Friedenberg, 1967; Getzels, 1957; Goodman, 1964, 1967; Hunt, 1966). In a society identified with rapid transformation of structure and mores, the aim of education must be to prepare individuals to make reasonable value decisions on the basis of available information and to supplant the now obsolete goal of enculturation.

Hunt (1966) suggests that the function of education in contemporary society must be to modify the cognitive structures of students, "...to produce persons who are questioning, inventive, original, critical, creative, and, if need be, different" (Ibid p. 289). Thus, the implied function of education, particularly higher education, is to open closed minds, to increase intellectual flexibility, and to prevent blind acceptance of dogma.

The present study was designed to examine the nature and extent of the relationship between dogmatism as defined by Rokeach (1960), rigidity as defined by Gough (1952), authoritarianism as defined by Adorno et al (1950), opinionation as defined by Peters (1961) in the Canadian version of Rokeach's scale, and academic achievement as defined by overall college grade point average. The relationship between dogmatism and learning has been examined previously by Ehrlich (1961).

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Instrumentation

A. Dogmatism Scale

General dogmatism, conceptualized as openness or closedness of belief systems, is concerned with "how", rather than "what", a person believes (Rokeach, 1960). Each item of the scale was designed to transcend specific ideological positions and focus on the formal and structural characteristics of various positions. Dogmatic adherence to such diverse view points as capitalism and communism, catholicism and anti-catholicism should be reflected at one end of the continuum, whereas a non-dogmatic response pattern should appear at the opposite pole of the continuum. The 40 item Form E scale was used in this study.

B. Gough-Sanford Rigidity Scale

Rigidity is defined as resistance to change in single habits or sets. The Gough-Sanford Rigidity Scale (Gough, 1952) consists of 22 general statements empirically related to rigid behavior.

C. California F Scale

The 29 item F scale is a measure of pro-fascist tendencies, and was designed as an indirect measure of prejudice. Individuals who obtain high scores on this scale also tend to score high on measures of ethnocentrism, anti-Semitism, and anti-Negro feeling and tend to be politically conservative.

D. Canadian Opinionation Scale

Rokeach (1960) presented two versions of the opinionation scale, versions C and CE, standardized on American and English samples respectively.

This scale is designed as a measure of general intolerance and of two kinds of opinionation, rejection and acceptance. As the more closed minded find it harder to distinguish between information and the source of information, the 40 items of the scale combine statements of fact with acceptance or rejection of both speaker and statement. Subjects scoring high on this scale tend to accept those who agree with their belief systems and to reject those who disagree.

Peters (1961) obtained Rokeach's permission to revise some scale items for Canadian subjects. Changes ranged from substitutions of single words to complete revisions of statements. While the content was altered, the direction and general structure of the items remained the same.

This battery of scales was administered employing a Likert method of scaling as previously used by Rokeach, McGovney and Denny (1960) and Rubenowitz (1963).

Procedure

The aim of this investigation was to determine whether the most effective prediction of freshmen college achievement could be obtained through using raw scores from the four scales or through using a set of factor scores extracted from a combination of the four as predictors of grade point average.

Sample and Testing

The four measures were administered to 738 freshmen students enrolled in introductory Educational Psychology at the U. of A. during the 1967-1968 academic year. Random numbers were utilized to select a sample of 140 cases. Overall grade point averages for this sample were obtained at the

end of the scholastic year. For purposes of cross validation the sample was divided into two groups. Using random numbers, 50 subjects were selected as a cross validation group; the remaining 90 were used to develop the necessary regression equations. The resultant analysis may be described in 4 steps.

A. Factor Analysis

The 4 psychological measures included a total of 131 items. A correlation matrix of order 131 was subjected to a principle axis factor analysis (N = 140). Thirty factors having eigenvalues greater than one were obtained. The first three appeared interpretable and were subjected to a varimax rotation.

B. Derivation of Factor Scores

Three factor scores were calculated for each subject using the procedure described by Harman (1967).

C. Multiple Regression

Two multiple regression equations were developed for the validation sample of 90 cases. In the first equation, raw scores from the measures were used to predict grade point averages. In the second equation, the three factor scores were used as predictors. Multiple correlations were obtained.

D. Cross Validation

Both sets of regression weights obtained were applied to the raw

scores and to the factor scores of the subjects in the cross validation sample. Two predictions of grade point averages were calculated. Each of these was correlated with the actual grade point averages obtained by the subjects. Cross validation consisted of testing the significance of the difference between the multiple correlations obtained from the sample of 90 cases and the correlation between actual and predicted grade point averages obtained from the cross validation sample of 50 subjects.

Results

A. Factor Analysis of Psychological Tests

The three varimax rotated factors accounted for 15.33 percent of the total variance. Loadings exceeding $\pm$ .300 on the rotated factors have been interpreted. Of the 131 items, 31 loaded on the first factor, 29 on the second factor, and 24 on the third factor. Tables 1, 2, and 3 present test items and factor loadings for these three factors. Inspection of the items presented in the tables will reveal the basis of the following interpretation.

Factors I and II were interpreted as Right Wing (Conservative) Rigidity and as Left Wing (Radical) Rigidity. Factor III also appeared to be a rigidity factor, involving pro-religious beliefs and anti-communist attitudes.

B. Calculation of Regression Equations

Regression weights were obtained by applying the least squares technique to the data of the validation sample. Two sets of weights, for

the prediction of grade point average from raw scores and from factor scores, were calculated. These values, and the multiple correlations obtained, are presented in table 4.

C. Cross Validation of Predictions

The multiple correlations obtained from the regression equations in the validation sample and the correlation between the actual and predicted grade point averages in the cross validation sample are shown in table 4. The test for cross validation consisted of testing the significance of the difference between the multiple correlation from the validation sample and the corresponding correlation of actual and predicted grade point averages from the cross validation sample. These values are also shown in table 4.

Discussion and Conclusions

Neither the factor scores nor the raw scores from the measures proved to be strong predictors of academic performance as represented by grade point average, yielding multiple Rs of .33 and .37 respectively. However, the measures employed in this study were more representative of cognitive style than of cognitive power or efficiency. The finding of relatively low multiple Rs was, therefore, not unexpected.

From the results of this study it can be concluded that only the raw scores for the four psychological tests are significantly related to the academic achievement of college freshmen. This is substantiated by the cross validation for the four tests in which the correlation between the actual and predicted grade point averages of the crossvalidation group (.15) is not significantly different from the multiple correlation (.37)

obtained from the original sample of 90 cases. Therefore, the four measures in their original scoring format would be of some use in the prediction of academic performance. The three factor scores obtained appeared to be unrelated to academic performance.

In the light of recent happenings on many campuses, the three factors which were extracted are of some interest. Inspection of the test items involved suggested that the factors represent specific forms of rigidity. Further, it would appear that at least two of the factors identified may be viewed in relationship to student activism.

The appearance of a militant group of student activists on many campuses has given rise to some important questions. For example, do conditions on campuses give rise to militant student groups who are sincerely working toward their improvement? Or, on the other hand, are there appearing on campuses groups of students who, because of their rigidly held left wing beliefs, are predisposed to protest and to create issues about which to protest? This question might be investigated through testing freshmen and determining whether those who attain the highest scores on factor II actually become involved in activist groups.

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Table 1

Test Items and Their Loadings on Factor I

Right Wing Rigidity (Conservatism)

Test Item		Factor I Loading	Originial Test
47	What this country needs most, more than laws and political programs, is a few courageous, tireless, devoted leaders in whom the people can put their faith.	.580	Cal. F
23	A person who gets enthusiastic about too many causes is likely to be a pretty "wishy-washy" sort of person.	.567	Dog.
22	Of all the different philosophies which exist in this world there is probably only one which is correct.	.562	Dog.
119	Only a misguided idealist would believe that the Soviet Union is for peace.	.524	Can. Op.
'85	I often find myself thinking of the same tune or phrases for days at a time.	.471	Rig. Scale
58	Some people are born with an urge to jump from high places.	.456	Cal. F
115	It is the radicals and labor racketeers who yell the loudest about labor's right to strike.	.443	Can. Op.
112	It's simply incredible that anyone should believe that socialized medicine will actually help solve our health problems.	.424	Can. Op.
24	To compromise with out political opponents is dangerous because it usually leads to the betrayal of our own side.	.419	Dog.
125	History will clearly show that Diefenbaker's victory over the Liberal Party in 1957 was a step forward for the Canadian people.	.400	Can. Op.
37	The present is all too often full of unhappiness. It is only the future that counts.	.395	Dog.
120	It is mostly the noisy radicals who try to tell us that we will be better off under socialism.	.388	Can. Op.

Table 1 (cont'd)

Test Item		Factor I Loading	Original Test
35	It is often desirable to reserve judgement about what's going on until someone has a chance to hear the opinion of those one respects.	.387	Dog.
30	There are two kinds of people in this world, those who are for the truth and those who are against the truth.	.378	Dog.
31	My blood boils when a person stubbornly refuses to admit he is wrong.	.372	Dog.
56	When a person has a problem or worry, it is best for him not to think about it, but to keep busy with more cheerful things.	.370	Cal. F
83	I think it is wise to do things in a conventional way.	.354	Rig. Scale
55	Homosexuals are hardly better than criminals and ought to be severely punished.	.353	Cal. F
54	Most of our social problems would be solved if we could somehow get rid of the immoral, crooked and feeble minded people.	.343	Cal. F.
87	I usually check more than once to be sure that I have locked a door, put out the light or something of that sort.	.343	Rig. Scale
113	A person must be pretty ignorant if he thinks that Diefenbaker is going to let big business run this country.	.328	Can. Op.
64	Most people don't realize how much our lives are controlled by plots hatched in secret places.	.324	Cal. F
4	It is only natural that a person would have a much better acquaintance with ideas he believes in than ideas he opposes.	.322	Dog.
28	In times like these it is often necessary to be more on guard against ideas put by people or groups in one's own camp than by those in the opposing camp.	.322	Dog.

Table 1 (cont'd)

Test Item		Factor I Loading	Original Test
72	I prefer work that requires a great deal of attention to detail.	.322	Rig. Scale
122	Any intelligent person can plainly see that the real reason Canada is spending so much for defense is to stop aggression.	.322	Can. Op.
126	The American rearmament program is clear and positive proof that they are willing to sacrifice to preserve their freedom.	.316	Can. Op.
131	Anyone who knows what's going on will tell you that those who favour communism are traitors to their country.	.314	Can. Op.
76	I usually maintain my own opinions even though many other people may have a different point of view.	.313	Rig. Scale
129	A study of Canadian history shows that it is the Canadian businessman who has contributed most to our society.	.308	Can. Op.
81	I usually find that my own way of attacking a problem is best, even though it doesn't always seem to work in the beginning.	.302	Rig. Scale

Table 2

Test Items and Their Loadings on Factor II

Left Wing Rigidity (Radicalism)

Test Item		Factor II Loading	Original Test
17	If given the chance I would do something of great benefit to the world.	.565	Dog.
41	Obedience and respect for authority are the most important virtues children should learn.	.488	Cal. F.
96	It's the people who believe everything they read in the papers who are convinced that Russia is pursuing a ruthless policy of imperialist aggression.	.473	Can. Op.
39	Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.	.452	Dog.
130	Even a person of average intelligence knows that to defend ourselves against aggression we should welcome all help--including France's Spain.	.435	Can. Op.
18	In the history of mankind there have probably been just a handful of really great thinkers.	.434	Dog.
55	Homosexuals are hardly better than criminals and ought to be severely punished.	.431	Cal. F
51	An insult to our honour should always be punished.	.421	Cal. F
67	Nowadays when so many different kinds of people move around and mix together a person has to protect himself especially carefully against catching an infection or disease from them.	.415	Cal. F
21	It is only when a person devotes himself to an ideal or cause that life becomes meaningful.	.413	Dog.
105	Make no mistake about it. The best way to achieve security is for the government to guarantee jobs for all.	.389	Can. Op.

Table 2 (cont'd)

Test Item		Factor II Loading	Original Test
97	It's mainly those who believe the propaganda put out by the real estate interest who are against federal slum clearance programs.	.312	Dog.
98	A person must be pretty gullible if he really believes that the Communists have actually infiltrated into government and education.	.369	Can. Op.
95	A person must be pretty shortsighted if he thinks that the Conservatives represent the best interests of the Canadian people.	.358	Can. Op.
107	Thoughtful persons know that the Conservatives are not really interested in democracy.	.357	Can. Op.
94	There are two kinds of people who fought Primier Douglas' socialization program: the selfish and the stupid.	.354	Can. Op.
73	I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters.	.344	Rig. Scale
71	There is usually only one best way to solve most problems.	.337	Rig. Scale
68	Nowadays more and more people are prying into matters that should remain personal and private.	.335	Cal. F
33	Most of the ideas which get printed nowadays aren't worth the paper they are printed on.	.331	Dog.
19	There are a number of people I have come to hate because of the things they stand for.	.329	Dog.
16	The main thing in life is for a person to do something of great benefit to the world	.317	Dog.
74	I dislike to change my plans in the midst of an undertaking.	.317	Rig. Scale

Table 2 (cont'd)

Test Item		Factor II Loading	Original Test
109	It's all too true that the rich are getting richer and the poor are getting poorer.	.314	Can. Op.
38	If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all".	.312	Dog.
106	It's perfectly clear to all decent people that all this fuss about communism does more harm than good.	.309	Can. Op.
81	I usually find my own way of attacking a problem is best even though it doesn't always seem to work in the beginning.	.304	Rig. Scale
12	In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.	.302	Dog.
89	I believe that promptness is a very important personality characteristics.	-.410	Rig. Scale

Table 3

Test Items and Their Loadings on Factor III

Religious Anti-Communist Rigidity

Test Item		Factor III Loading	Original Test
69	The wild sex life of the old Greeks and Romans was tame compared to some of the going-on in this country, even in places where people might least expect it.	.439	Cal. F
118	It's usually the trouble-makers who talk about government ownership of public utilities.	.421	Can. Op.
86	I have a work and study schedule which I follow carefull.	.418	Rig. Scale
46	Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down.	.406	Cal. F
66	Familiarity breeds contempt.	.405	Cal. F
116	It is foolish to think that the N.D.P. is really the party of the common man.	.391	Can. Op.
22	Of all the different philosophies which exist in this world there is probably only one which is correct.	.386	Dog.
32	A person who thinks primarily of his own happiness is beneath contempt.	.386	Dog.
10	There is so much to be done and so little time to do it in.	.381	Dog.
44	The businessman and the manufacturer are much more important to society than the artist and the professor.	.369	Cal. F
75	I never miss going to church.	.345	Rig. Scale
54	Most of our social problems would be solved if we could somehow get rid of the immoral crooked, and feebleminded people.	.340	Cal. F
88	I have never done anything dangerous for the thrill of it.	.339	Rig. Scale
120	It is mostly the noisy radicals who try to tell us that we will be better off under socialism.	.338	Can. Op.

Table 3 (cont'd)

Test Item		Factor III Loading	Original Test
41	Obedience and respect for authority are the most important virtues children should learn.	.331	Cal. F
51	An insult to honour should always be punished.	.331	Cal. F
9	It is only natural for a person to be rather fearful of the future.	.327	Dog.
62	No weakness or difficulty can hold us back if we have enough will power.	.327	Cal. F
42	A person who has bad manners, habits and breeding can hardly be expected to get along with decent people.	.316	Cal. F
48	No sane, normal, decent person could ever think of hurting a close friend or relative.	.307	Cal. F
28	In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.	.301	Dog.
53	There is hardly anything lower than a person who does not feel a great love, gratitude, and respect for his parents.	.300	Cal. F
99	It's mostly those who are itching for a fight who want peace time conscription.	-.352	Can. Op.
102	It's perfectly clear that the decision to execute the Rosenbergs has done the United States more harm than good.	-.495	Can. Op.

Table 4

Prediction of Grade Point Averages of Validation Sample by Types of Predictor

Type of Predictor	Variable	Weight	Multiple R	Correlation of actual and predicted scores for cross-validation sample
Raw Score	Dogmatism Scale	.0134	.37*	.15[a]
	California F Scale	-.0247		
	Gough-Sanford Rigidity	.0128		
	Canadian Opinionation Scale	-.0034		
	Constant	5.6798		
Factor Scores	Right-Wing Rigidity	.0084	.33*	.07[b]
	Left-Wing Rigidity	-.0133		
	Religious Anti-Communism	-.0290		
	Constant	7.3675		

* The difference between the multiple Rs reported herein are not significant.

a. Not significantly different from the multiple correlation.

$$Z = \frac{Z_{R1} - Z_{R2}}{\sqrt{\frac{1}{(N_1-3)} + \frac{1}{(N_2-3)}}} = \frac{.3884 - .1511}{\sqrt{.0319}} = 1.33 \text{ required for significance } 1.96$$

b. Significantly different from the multiple correlation.